

AMENDED CLAIM SET:

1. (cancelled).

2. (currently amended) A process for producing ϵ -caprolactone by the oxidation of cyclohexanone, comprising the steps of:

feeding a crude reaction mixture to a first distillation column having a column bottom temperature from about 100°C to about 200°C and a column top pressure of about 100 mmHg or less;

distilling off a first distillate from the top of the first distillation column, the first distillate containing low boiling components including unreacted cyclohexanone;

recovering a first side-cut fraction from an intermediate tray of the first distillation column, the first side-cut fraction containing unreacted cyclohexanone in a higher concentration than in the first distillate;

recovering a first bottom liquid from the bottom of the first distillation column, the first bottom liquid containing high boiling components including ϵ -caprolactone;

introducing the first side-cut fraction to a second distillation column;

recovering a second bottom liquid containing unreacted cyclohexanone from the bottom of the second distillation column;

recycling the second bottom liquid into the raw material

cyclohexanone;

introducing the first bottom liquid to a third distillation column to thereby yield a third distillate containing ϵ -caprolactone from the third distillation column.

3. (currently amended) The process according to claim one of claims 1 and 2, further comprising oxidizing cyclohexanone with a peracid.

4. (original) The process according to claim 3, wherein the peracid is an organic peracid.

5. (original) The process according to claim 4, wherein the organic peracid is peracetic acid.

6. (original) The process according to claim 3, wherein the crude reaction mixture mainly comprises the peracid, an acid derived from the peracid, a solvent for the peracid, cyclohexanone, ϵ -caprolactone, adipic acid, and a polymerized product of ϵ -caprolactone.

7. (original) The process according to claim 3, wherein the first side-cut fraction mainly comprises the peracid, an acid derived from the peracid, a solvent for the peracid, and

cyclohexanone.

8. (original) The process according to claim 3, wherein the first distillate mainly comprises the peracid, an acid derived from the peracid, a solvent for the peracid, and cyclohexanone.

9. (original) The process according to claim 3, wherein the first bottom liquid mainly comprises ϵ -caprolactone, adipic acid, and a polymerized product of ϵ -caprolactone.

10. (original) The process according to claim 3, wherein the second bottom liquid mainly comprises an acid derived from the peracid and unreacted cyclohexanone.

11. (original) The process according to claim 3, wherein the third distillate mainly comprises ϵ -caprolactone.